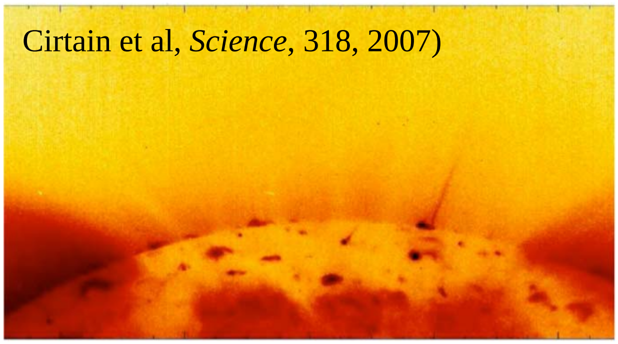
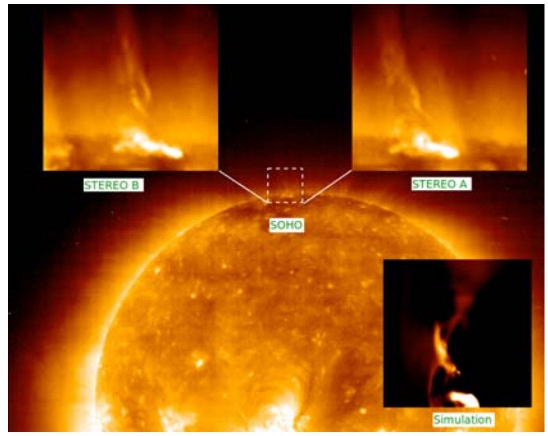
A Model for Solar Coronal Jets

P.I. *S. K. Antiochos* NASA/GSFC

Coronal jets are transient ejections of solar plasma that are generally observed in coronal holes (open-field regions) and, therefore, may be important contributors to the solar wind mass and energy. One of the new results from Hinode (example shown at left) is that jets are more common than previously believed.



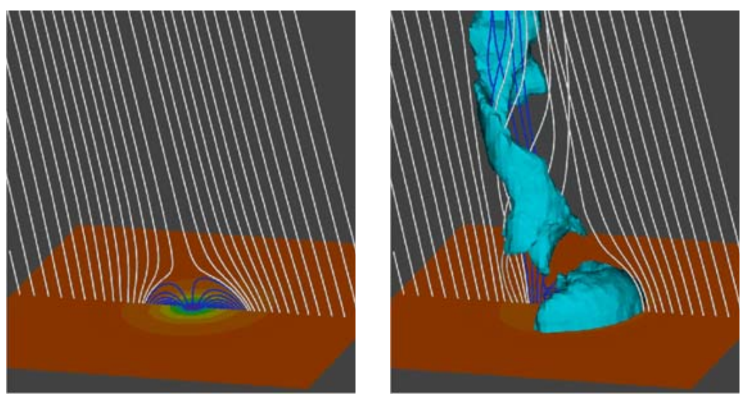
Cirtain et al, *Science*, 318, 2007)



Recently the STEREO spacecraft discovered that jets can exhibit a twist motion, an indication that tangled magnetic fields propelled the jet. White indicates bright structures at the jet's base.

Under the HTP program a model for the jets was developed in which the acceleration is due to interchange magnetic reconnection between the closed field of an embedded bipole and surrounding open field in a coronal hole. The key new feature of the model is that the reconnection is driven by twist in the closed field region, which results in both the observed jet speeds and helical structure.

Field lines (white and blue) and mass density (indigo isosurface) at two times in the simulation: initially and near the peak of the jet acceleration. Note the helical structure of the reconnected field lines (from Pariat et al.)



Reference: Patsourakos et al., ApJ, 680, L73, 2008; Pariat et al., ApJ, in press, 2008